

REMARKS

Applicant thanks Examiner Song for granting the telephonic interview on July 8, 2004. This communication is in response to the Official Action mailed May 28, 2004 and the above-mentioned telephonic interview. If any additional fees are required, the Assistant Commissioner is authorized to charge the same to the account of Barnes & Thornburg, Deposit Account No. 10-0435, with reference to our matter number 30705-68918.

Claims 1-2, 4-5, and 14-41 are pending. Applicant respectfully requests reconsideration and allowance of claims 1-2, 4-5, and 14-41 as amended and in view of the reasons set forth hereinbelow.

Amendment in the claims

Claim 19 has been amended for the purpose of clarity by including a “,” after the words “second end”. There is no new matter added.

Claims 36 and 38 have been amended for the purpose of clarification and consistency. The first end of the device is referred to the end that is configured for placement into a well of a plate.

There is no new matter added.

Rejection of Claims 1-2, 4-5, 14-23, 27-31, 36-39 Under 35 U.S.C. § 103(a)

Claims 1-2, 4-5, 14-23, 27-31, 36-39 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Heilig et al. (U.S. Patent No. 5,266,284) in view of Knittel (U.S. Patent No. 3,972,689). In particular, starting on page 3, the Examiner alleges that the proposed Heilig/ Knittel combination renders each of the rejected claims obvious.

Applicant respectfully submits that this rejection is improper because a *prima facie* case of obviousness has not been established.

MPEP 2143 reads in part as follows:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success

must both be found in the prior art, not in applicant's disclosure.
In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

MPEP 2143.1 reads in part as follows.

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art.

Applicant submits that all three criteria for a *prima facie* case have not been met. First, there is nothing in Heilig or Knittel or in the knowledge generally available to one of ordinary skilled in the art that explicitly or implicitly teaches, suggests or motivates the combination of Heilig and Knittel.

“The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art.” *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also *In re Lee*, 277 F.3d 1338, 1342-44, 61 USPQ2d 1430, 1433-34 (Fed. Cir. 2002) (discussing the importance of relying on objective evidence and making specific factual findings with respect to the motivation to combine references); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). (See MPEP 2143.1)

Applicant submits that neither Heilig nor Knittel addresses the problems that are to be solved by the present invention. The present invention deals with the problems relating to the complexity of the prior art device and the limited numbers of samples that can be run at one time. (see specification paragraphs [0005]-[0006]).

Contrarily, Heilig teaches a crystal growth application that is suitable for space, in contrast to an earth borne application. (col. 1, lines 28-30). Specifically, Heilig teaches an arrangement for carrying out crystal growing experiments, particularly under conditions of weightlessness, by which the starting fluids can be transport separately and mixed at the desired point in time. (col. 1, lines 48-52). Heilig's arrangement requires many components (Figures 1a-19) for performing different functions, and if possible, without manual intervention. (col. 1, lines 28-47). Although Heilig teaches an arrangement having a plurality of cells (Figures 18, 19), which may accommodate more samples, the arrangement is clearly very complex.

Likewise, Knittel teaches a complex device. Knittel teaches a device for growing crystals of chalcogenides, alloys, multi-element crystals and lead salts (col. 1, lines 4-6), particularly inside an evacuated ampoule (col. 1, lines 28-38) that requires a temperature gradient (col. 2, lines 33-46) in order to produce high quality crystals. Thus, the device of Knittel is provided with “independent heater winding” and “insulation” prior to sliding into a “vertical furnace tube.” (col. 2, lines 39-43). Further, the device has to have a connection made to the source reservoir for evacuation (col. 2, lines 55-56). In addition, Knittel’s device can accommodate only one sample.

In view of the forgoing, one of ordinary skill in the art would not be motivated to use Heilig or Knittel’s teaching or the combination thereof to solve the problems set forth in the present application. The lack of teaching, suggestion, and motivation to use the references individually or in combination, makes it improper to combine the references. (MPEP 2143.01)

Further, the Examiner has not pointed to any objective evidence or made any specific factual findings with respect to the motivation to combine the references.

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). (See MPEP 2143.01).

The Examiner has expressed that Knittel teaches a diffusion capillary channel 4 that can be used to produce high quality crystals, providing the motivation to combine the references. The Examiner has overlooked Knittel’s teaching that in order to produce high quality crystals, in addition to the diffusion capillary channel 4, the channel has to extend fully into the liquified sample 5 (col. 2, lines 3-6) and the temperature difference is maintained between the source material and the crystal (col. 2, lines 6-7). Therefore, there is no motivation to combine Heilig and Knittel as the Examiner has proposed because the conditions for superior quality are lacking in the proposed combined device.

Based on the forgoing reasons, Applicant submits that the first requirement for *prima facie* case of obviousness is not met. Accordingly, the rejections of claims 1-2, 4-5, 14-23, 27-31, 36-39 should be withdrawn.

Second, Applicant further submits that even if the references are combined, there is no evidence for a reasonable expectation of success.

The Examiner alleges that it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Heilig’s vapor diffusion device with Knittel’s

diffusion limiting channel between a source and a growing crystal to grow crystals of superior quality and to improve stoichiometric control. (See Office Action mailed on 05/28/04, page 3). However, it is not obvious how Knittel's diffusion limiting channel can be placed in Heilig's device. Further, it is not obvious how placing Knittel's channel in Heilig's device will interfere with the operation of the device since Heilig's device requires a push up movement of piston 140 and the formation of the drop of protein solution 107 (col. 4, line 57- col. 5, line 43).

The Examiner has proposed during the telephonic interview on July 8, 2004, that the cross-diameter of Heilig's device can be reduced to Knittel capillary channel. Again, this is not workable without further and non-obvious modifications of Heilig's device in relation to the placement of reservoirs 130 and 132 and the connection to rotating part 112 and the pushup piston 140.

Further, according to Knittel, in order to produce the high quality crystals, the diffusion limiting channel extends fully into the liquified sample 5 (col. 2, lines 3-6) and the temperature difference is maintained between the source material and the crystal (col. 2, lines 6-7). The conditions required by Knittel cannot be produced within the Heilig's device. Accordingly, there is no reasonable expectation that high quality crystals can be produced in the modified device, based on the Knittel and Heilig's teachings. In addition, the resulting device would still be very complex and does not solve the problem intended by the present invention. Contrarily, the present invention provides a device that is simple and can accommodate a plurality of samples. (see Figure 2C and specification paragraphs [0005]-[0006]). Since there is no reasonable expectation of success by combining the parts of the devices as suggested by the Examiner, or the teachings of Heilig and Knittel, the second requirement for a *prima facie* case is also lacking.

Third, Applicant submits that the proposed combined Heilig and Knittel does not teach or suggest all the claim limitations. Applicant herein fully incorporate the remarks set forth in the Amendment and Response under 37 C.F.R. § 1.111 submitted on March 19, 2004. In addition, Applicant submits the following.

Discussion of Claim 1

Claim 1 includes "the first end of the device configured for placement in a well of a plate containing the reservoir solution." The examiner asserts that the diffusion limiting channel 4 itself "reads on applicant's device because it has a first end, a second end and a discrete diffusion pathway extending from the first end to the second end." However, the diffusion limiting channel 4 of Knittel does not have the first end "configured for placement

in a well of a plate containing the reservoir solution.” Rather, the whole diffusion limiting channel 4 of Knittel (both ends) is placed within an ampoule, not a well. (see Figures. 1 and 2). The Examiner further asserts that the diffusion limiting channel is capable of being placed in the well of a plate. Considering the configuration of the diffusion limiting channel 4 (see Figures. 1 and 2), simply taking the diffusion limiting channel 4 out of tube 1 and placing one end in a well, without any changes in the configuration so taught only by the present application, cannot affect the control of diffusion rate.

Accordingly, the Examiner’s proposed Heilig and Knittel combination does not arrive at the invention defined by claim 1.

Discussion of Claims 2, 4, 5, 29, and 30

Each of claims 2, 4, 5, 29, and 30 includes claim 1 as a base claim. Therefore, each of these claims includes the same limitations of claim 1. As such, the discussion of claim 1 is pertinent to each of claims 2, 4, 5, 29, and 30. In addition, each of claims 2, 4, 5, 29, and 30 recites further limitations which render them even further patentable in light of the proposed Heilig and Knittel combination.

Discussion of Claim 14

The Examiner asserts that the invention of claim 14 is obvious in light of Heilig and Knittel since Knittel teaches that alternative constricting channel configurations can be utilized. Applicant submits that Knittel does not teach different geometry channels on a single channel unit.

Further Examiner asserts that the combination of Heilig and Knittel teaches that the channel unit is a separate housing part, thus is inherently capable of being rotated. Applicant submits that “separate housing part” cannot reasonably be interpreted as “inherently capable of being rotatable”. Heilig explicitly teaches the arrangement “comprises three housing parts 106, 102, 112, with the third (rotating part) 112 being rotatably disposed with respect to the second (center part) 102.” (col. 4, lines 59-62). Applicant submits that only part 112 is rotatable and parts 106 and 102 are not rotatable.

Since claim 14 recites “channel unit and the selection unit rotate individually to align the reservoir chamber”, and rotating part 112 is neither channel unit nor selection unit, the combined Heilig and Knittel does not teach all the limitations of claim 14.

Discussion of Claims 15-18

Each of claims 15-18 includes claim 14 as a base claim. Therefore, each of these claims includes the same limitations of claim 14. As such, the discussion of claim 14 is pertinent to each of claims 15-18. In addition, each of claims 15-18 recites further limitations

which render them even further patentable in light of the proposed Heilig and Knittel combination.

Discussion of Claim 19

Claim 19 includes “the seal and the second end define a space for the crystal growth solution”.

The propose combined Heilig and Knittel does not teach “the seal engages the second end” and “the seal and the second end define a space for the crystal growth solution.”

Discussion of Claims 20-23, 27, 28 and 31

Each of claims 20-23, 27, 28 and 31 includes claim 19 as a base claim. Therefore, each of these claims includes the same limitations of claim 19. As such, the discussion of claim 19 is pertinent to each of claims 20-23, 27, 28 and 31. In addition, each of claims 20-23, 27, 28 and 31 recites further limitations which render them even further patentable in light of the proposed Heilig and Knittel combination.

Discussion of Claim 36

Claim 36 recites:

36 A device for controlling the rate of vapor diffusion during crystal growth, the device comprising

- a second end having a depression to provide a space for a crystal growth solution,
- a first end for placement into a well of a plate, the well containing a reservoir solution,
- a generally cylindrical body extending from the first end to the second end, and
- a diffusion pathway extending through the body from the first end to the second end, the diffusion pathway having a geometry to control the rate of vapor diffusion between the crystal growth solution and the reservoir solution.

Knittel teaches a device being an ampoule having one end for supporting crystal growth, but the second end is not for placing into a well of a plate, and the diffusion channel does not “extend from the first end to the second end.” (see Figures 1 and 2). Heilig does not address these deficiencies.

Accordingly, the proposed combination of Heilig and Knittel does not arrive at the invention of claim 36.

Discussion of Claims 37-39

Each of claims 37-39 includes claim 36 as a base claim. Therefore, each of these claims includes the same limitations of claim 36. As such, the discussion of claim 36 is pertinent to each of claims 37-39. In addition, each of claims 37-39 recites further limitations which render them even further patentable in light of the proposed Heilig and Knittel combination.

In view of the reasons set forth hereinabove, Applicant respectfully requests that the rejection of claims 1-2, 4-5, 14-23, 27-31, 36-39 based on Heilig and Knittel be withdrawn.

Rejection of Claims 24-26, 32, 34, 35, 40-41 Under 35 U.S.C. § 103(a)

Claims 24-26, 32, 34, 35, 40-41 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Heilig et al. (U.S. Patent No. 5,266,284) in view of Knittel (U.S. Patent No. 3,972,689) as applied to claims 1-2, 4-5, 14-23 and 27-31 and further in view of Kim et al. (U.S. Patent No. 6,039,804).

Each of claims 24-26, 32, 34, 35, 40-41 includes either claim 1, 19, or 36 as a base claim. Accordingly, each of claims 24-26, 32, 34, 35, 40-41 includes the same limitations as the base independent claim. The deficiencies of the proposed Heilig and Knittel combination are discussed above. Kim does not address these deficiencies. Therefore, a *prima facie* case of obviousness has not been established with respect to the subject claims and the Applicant respectfully requests that the rejection based on Heilig, Knittel and Kim be withdrawn.

Rejection of Claims 1, 2, 4, 5, 29-41 Under 35 U.S.C. § 103(a)

Claims 1, 2, 4, 5, 29-41 were rejected under 35 U.S.C. § 103(a) as unpatentable over Kim et al. (U.S. Patent No. 6,039,804) in view of Knittel (U.S. Patent No. 3,972,689).

Applicant submits that this rejection is also improper because a *prima facie* case of obviousness has not been established.

There is nothing in Kim or Knittel that explicitly or implicitly teaches, suggests, or motivates the combination thereof.

The Examiner asserts that it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kim's vapor diffusion device with Knittel's diffusion limiting channel. Applicant submits that there is nothing in Kim or Knittel that teaches, suggests, or motivates modifying Kim's vapor diffusion device with Knittel's diffusion limiting channel. Diffusion channels 30 of Kim extends from upper portion 36 of

central reservoir 28 to upper portion 42 of each drop chamber 32. (col. 4, lines 42-44). Diffusion channels 30 are generally trapezoidal in shape when viewed in transverse cross-section and open onto upper surface 14 of body 12. (col. 4, lines 44-46). The open onto upper surface feature of Kim's diffusion channels 30 provides the access for the deposition of a vapor-impermeable substance to terminate crystallization in any one of the four drop chambers 32. (col. 5, lines 18-23). Knittel's diffusion limiting channel 4 does not have such opening, modifying Kim's vapor diffusion device with Knittel's diffusion limiting channel will render Kim's device unsatisfactory for its intended purpose. Therefore, there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). MPEP 2143.01.

Applicant further submits that even if Kim and Knittel are combined, the combined references does not teach all the elements of the present claims.

Discussion of Claim 1

As previously discussed, a device defined by claim 1 includes the first end of the device being configured for placement in a well of a plate containing a reservoir solution. The proposed combine Kim and Knittel does not have this feature.

Discussion of Claim 36

As indicated above claim 36 recites that the device includes a first end, a second end, and a diffusion pathway extending from the first end to the second end. Neither Kim or Knittel teach or suggest a device having a first end, a second end, and a diffusion pathway extending from the first end to the second end. Accordingly, the proposed combination of Kim and Knittel does not arrive at the invention of claim 36.

Based on the forgoing reasons, the rejection based on combining Kim and Knittel should be withdrawn.

CONCLUSION

In view of the foregoing remarks, it is submitted that this application is in condition for allowance. Action to that end is hereby solicited.

In the event that there are any questions related to this response in particular, or to the application in general, the undersigned would appreciate the opportunity to address those questions directly in a telephone interview to expedite the prosecution of this application for all concerned.

In conclusion, should any additional fees be required to render this response timely, or in the event of overpayment, the Commissioner is hereby authorized to charge or credit

Applicant's undersigned counsel's Deposit Account 10-0435, with reference to our file 30705-68918. A duplicate copy of this authorization is enclosed for that purpose.

Respectfully submitted



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